Pollution Control Services Department
101 S. Richey, Suite H
Pasadena, Texas 77506
FAX: 713-274-6475 713-920-2831

June 19, 2015

To U.S. Environmental Protection Agency (EPA)

Subject: San Jacinto River Waste Pits Superfund Site – Harris County Technical Review Team additional sampling recommendations

Background

The San Jacinto River Waste Pits (SJRWP) Superfund site is located on the western side of the San Jacinto River, in Harris County, on the north and south side of Interstate Highway 10 (I-10). The northern impoundment area consisted of two areas (approximately 14 acres in size and separated by a berm) excavated into the native soil (on a 20 acre parcel). In 1965 and 1966, pulp and paper mill waste (liquid and solid) were placed in the impoundments. Subsequent to the abandonment of the impoundments, the area has undergone subsidence and over half of the original site is now submerged beneath surface water. Less information is known as to how the southern impoundment was constructed. The area was identified on a historic aerial photograph from the mid-1960's as a pond approximately 15 to 20 acres in size. Currently, this area is above surface water and is under business use (towing company, shipyard).

NORTHERN IMPOUNDMENT AREA

Existing data on contaminant distribution at the affected property is very limited in both spatial and temporal extent. Groundwater was previously sampled in 2011 from seven temporary wells (four in the shallow groundwater-bearing unit and three in a separate deeper unit). Off-shore sediment was sampled in 2012 and surface water in the vicinity was last sampled in 2011 by TCEQ as part of the Houston Ship Channel dioxin TMDL project.

To verify whether the existing temporary cap is adequately preventing on-going contaminant migration to the river until the implementaion of a permanent remedy, permanent groundwater wells should be installed and monitored, surface water should be re-sampled, bulk sediment samples should be collected, and sediment pore water should be sampled.

9674532

Groundwater

For the northern impoundment area, groundwater wells that monitor the shallow groundwater-bearing unit should be installed both in the central portion of the Site within the former waste disposal unit boundaries (to represent "source area" concentrations) and along the shore portion of the site perimeter (to monitor the potential for off-shore contaminant migration). The attached Figure 1 depicts a historic groundwater potentiometric surface map indicating groundwater in the shallow unit flows on-site from the direction of I-10 and creates a ridge (i.e., groundwater divide) down the middle of the site, with flow both to the east and west toward the river. Figure 1 shows locations for seven proposed permanent shallow groundwater-bearing unit monitoring wells (MW-N-01 thru 06). Actual well locations will depend on safety concerns, accessibility, and surface conditions that could make drilling prohibitive. On-going data collection from these wells should allow for determination of contaminant plume stability (e.g., increasing, stable, or decreasing concentrations) and allow for more adequate prediction of future potential contaminant migration.

In addition to monitoring the groundwater (i.e., verification sampling), a tidal study should be performed for the shallow groundwater-bearing unit. Downhole data logging pressure transducers should be placed in the newly installed permanent wells and allowed to record changing groundwater elevations over at least a 72 hour period. Coupled with data logging in a river stilling well, the data will quantify the tidal efficiancy (change in groundwater elevation relative to river stage change) and lag time (difference in time between river stage peak and groundwater elevation peak). This data will help indicate the degree to which river surface water is in connection with on-site groundwater, which in turn can provide an indication as to the adequacy of the existing temporary interim response action to prevent contaminant migration to the river.

Surface Water

Concentrations of seventeen polychlorinated dibenzo-dioxins and dibenzofurans (PCDD/Fs) in dissolved and suspended phases of surface water will be measured to assess potential fugacity gradients that drive contaminant fluxes from sediment pore water to surface water. Given that it is not possible to reliably quantify dioxins and furans in ambient water at picogram per liter concentrations from a 1-liter water sample, it is necessary to apply a high-volume sampling method to concentrate dissolved and suspended PCDD/Fs from several hundred liters of water before extracting and analyzing them. This is typically performed using an Axys Infiltrex sampler or EPA approved equivalent, using a glass fiber filter and XAD-2 resin.

Given the high level of mixing (relative to sediments) in tidal surface waters, it is not necessary to sample at a high level of spatial resolution. However, samples should be collected weekly at

each site for three or four weeks during the period when passive sediment samplers are deployed. Surface water sampling should be performed at only four locations:

1. in the San Jacinto River in shallow water (3-6 feet deep) overlying or immediately adjacent to the former northern impoundments,

2. in the Old San Jacinto River over the former southern impoundments,

3. upstream in the San Jacinto River at Banana Bend,

4. in the San Jacinto River at the IH-10 bridge.

Sediment and Pore Water

Sediment pore water sampling should be performed using passive samplers, such as solid-phase micro-extraction (SPME) fibers or other SPME devices such as polyethylene or polyoxymethylene sheets. SPMEs shouldbe deployed for approximately thirty days, as a tradeoff between the time required for chemical equilibrium and higher possibility of loss of samplers over longer deployments. SPMEs should be subsequently analyzed for seventeen polychlorinated dibenzo-dioxins and dibenzofurans. Due to kinetic considerations, the results for heavier congeners are likely to represent a lower limit of pore water concentrations.

Upon re-collection of deployed samplers, a surface whole sediment sample is recommended to be collected at each passive pore water sampler site. Each whole sediment sample should be analyzed for organic carbon content and the seventeen polychlorinated dibenzo-dioxins and dibenzofuran congeners.

To verify the continued functioning of the temporary cap, passive pore water samplers should be deployed at eight sites within the submerged portions of the temporary cap. At each site, samplers should be deployed at two depths in the core: just above the geotextile or geomembrane, and just below the surface of the temporary cap. A third passive sampler should be deployed in surface water just above the sediment surface.

To estimate potential contaminant fluxes from the former northern impoundments to the river, passive pore water samplers should be deployed in shallow (1-15 feet) un-capped San Jacinto River sediments at eighteen sites, including nine evenly spaced approximately ten feet from the edge of the cap, and another nine at a distance of from thirty to fifty feet from the edge of the cap, depending on depth considerations. At each site, samplers shouldl be deployed in the upper 1 foot of sediment, and at a greater depth, to be determined based on practical considerations at deployment. A third passive sampler should be deployed in surface water just above the sediment surface.

To investigate potential fluxes to a drainage ditch running between the former northern impoundments (southern portion) and IH-10, passive pore water samplers should be deployed in this ditch near the southeast and northwest outlets of the ditch to the San Jacinto River.

To provide a reference for the pore water results, passive pore water samplers should be deployed from two to four reference sites in the San Jacinto River that are not adjacent to the former impoundments. At least one of these reference sites should be a background location sufficiently far upstream (e.g., Banana Bend).

SOUTHERN IMPOUNDMENT AREA

Existing data on contaminant distribution at the affected property is very limited in both spatial and temporal extent. Groundwater was previously sampled in 2012/2013 from five permanent wells that monitor the shallow groundwater-bearing unit. Off-shore sediment was sampled in 2012 and surface water in the vicinity was last sampled in 2011 by TCEQ as part of the Houston Ship Channel dioxin TMDL project.

To verify whether the existing temporary cap is adequately preventing on-going contaminant migration to the river until a permanent remedy can be selected, additional permanent groundwater wells should be installed and monitored, surface water should be re-sampled, bulk sediment samples should be collected, and off-shore pore water should be sampled.

Groundwater

In the southern impoundment area there are five permanent wells that monitor the uppermost groundwater-bearing unit and one well that monitors a deeper unit (with the units separated by clay). The attached Figure 2 depicts a historic groundwater potentiometric surface map indicating groundwater in the shallow unit flows from the south-east to the north-west, beneath the former western waste disposal unit. All five shallow wells appear to have been located on (or near) the western waste disposal unit berm (with well SJMW002 on the upgradient side and the rest on the downgradient side).

For the southern impoundment area, additional shallow groundwater-bearing unit wells should be installed within the central portions of the former waste disposal pits so that representative "source area" concentrations can be determined (for use in predictive contaminant fate and transport modeling), as well as along the hydraulically upgradient perimeter (to confirm that there are no other upgradient unknown sources), and the hydraulically downgradient perimter of the Site (to determine what contamination could potnetiallt be leaving the Site). Figure 2 shows locations for five proposed additional permanent monitoring wells (two upgradient, two downgradient, and one in the central portion of the disposal pit MW-S-01 thru 05). Actual well locations will depend on safety concerns, accessibility, and surface conditions that could make drilling prohibitive. On-going data collection from all of the wells should allow for determination of contaminant plume stability (e.g., increasing, stable, or decreasing concentrations) and allow for adequate prediction of future potential contaminant migration.

In addition to monitoring the groundwater (i.e., verification sampling), a tidal study should be performed for the shallow groundwater-bearing unit. Downhole data logging pressure transducers should be placed in all of the monitoring wells (including the newly installed wells) and allowed to record changing groundwater elevations over at least a 72 hour period. Coupled with data logging in a river stilling well, the data will quantify the tidal efficiancy and lag time. This data will help indicate the degree to which river surface water is in connection with on-site groundwater, which in turn can provide an indication as to the adequacy of the existing temporary response action to prevent contaminant migration to the river until a permanent remedy is selected.

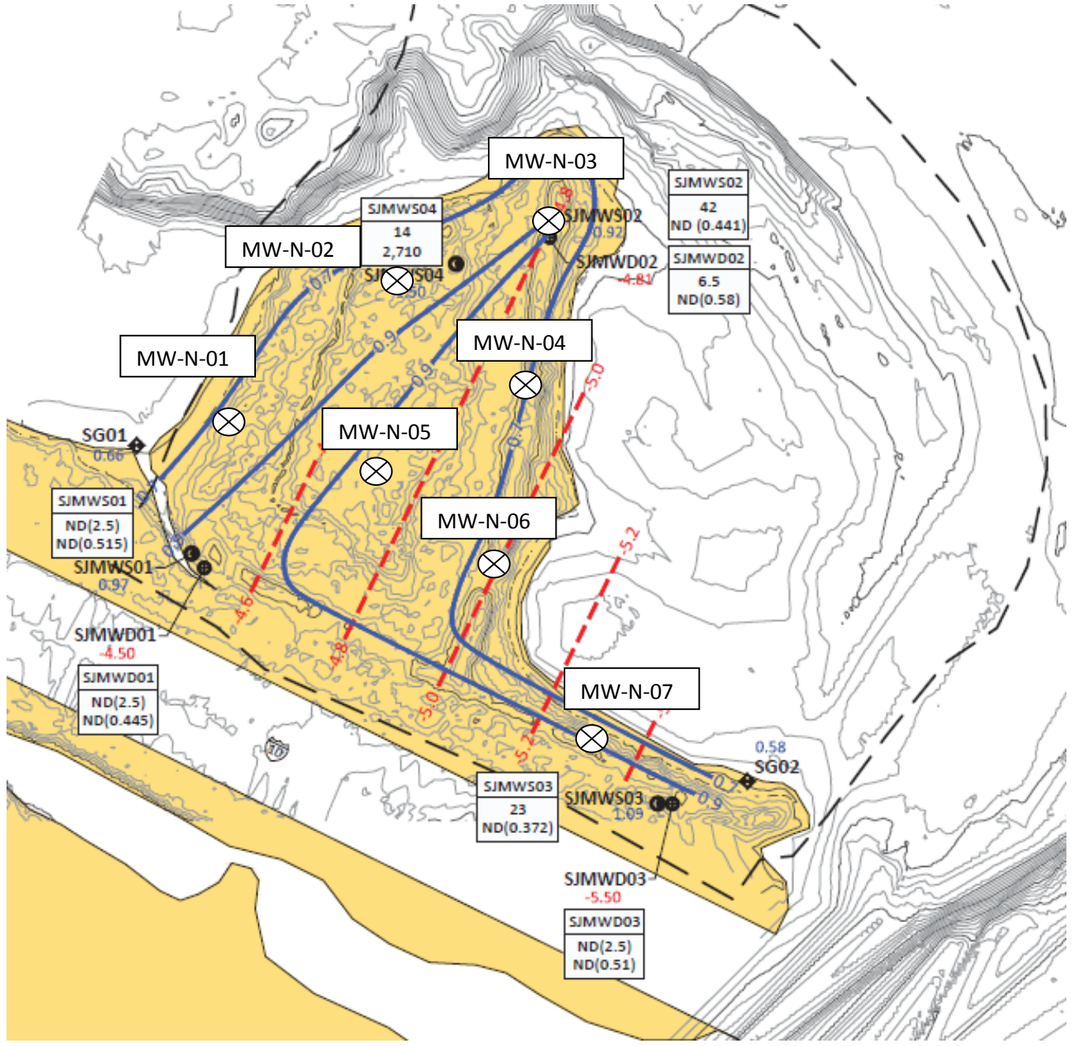
Sediment and Pore Water

To estimate potential contaminant fluxes from the former southern impoundment to the Old San Jacinto River, passive pore water samplers should be deployed in shallow (1-15 feet) sediments at five sites evenly spaced approximately ten feet from shore in the vicinity of the former southern impoundment, and another five at a distance of from thirty to fifty feet from shore, depending on depth considerations. At each site, samplers will be deployed in the upper 1 foot of sediment, and at a greater depth, to be determined based on practical considerations at deployment. A third passive sampler should be deployed in surface water just above the sediment surface.

To provide a reference for the pore water results, passive pore water samplers should be deployed at one or two reference sites in the Old San Jacinto River that are not adjacent to the former impoundment.

Upon re-collection of deployed samplers, a surface whole sediment sample should be collected at each passive pore water sampler site. Each whole sediment sample will be analyzed for organic carbon content and the seventeen polychlorinated dibenzo-dioxins and dibenzofuran congeners.

Pollution Control Services Department
101 S. Richey, Suite H
Pasadena, Texas 77506
FAX: 713-274-6475 713-920-2831



LEGEND:

- USEPA's Preliminary Site Perimeter
- Approximate Limit of Pre-TCRA Vegetated Area (Shoreline)
- SG02 — Staff Gauge
- SJMWS03 — Shallow Monitoring Well
- SJMWD03 — Deep Monitoring Well
- MW-N-01 — Proposed Shallow Monitoring Well
- 1.09 — Alluvial Potentiometric Elevation (ft)
- 0.9 — Alluvial Potentiometric Surface (ft)
- -5.50 — Chicot Aquifer Potentiometric Elevation (ft)
- -5.4 — Chicot Aquifer Potentiometric Surface (ft)
- SJMWS03 — Well ID
- 23 — TSS Concentration in Groundwater (mg/L)
- ND(0.372) — 2,3,7,8-TCDD Concentration in Groundwater (pg/L)
- ND(0.372) — Not Detected (One Half of the Detection Limit)

Figure 1 – Proposed Monitoring Well Locations – Northern Impoundments Area (base map: Anchor QEA, May 2013, Figure 3-17)

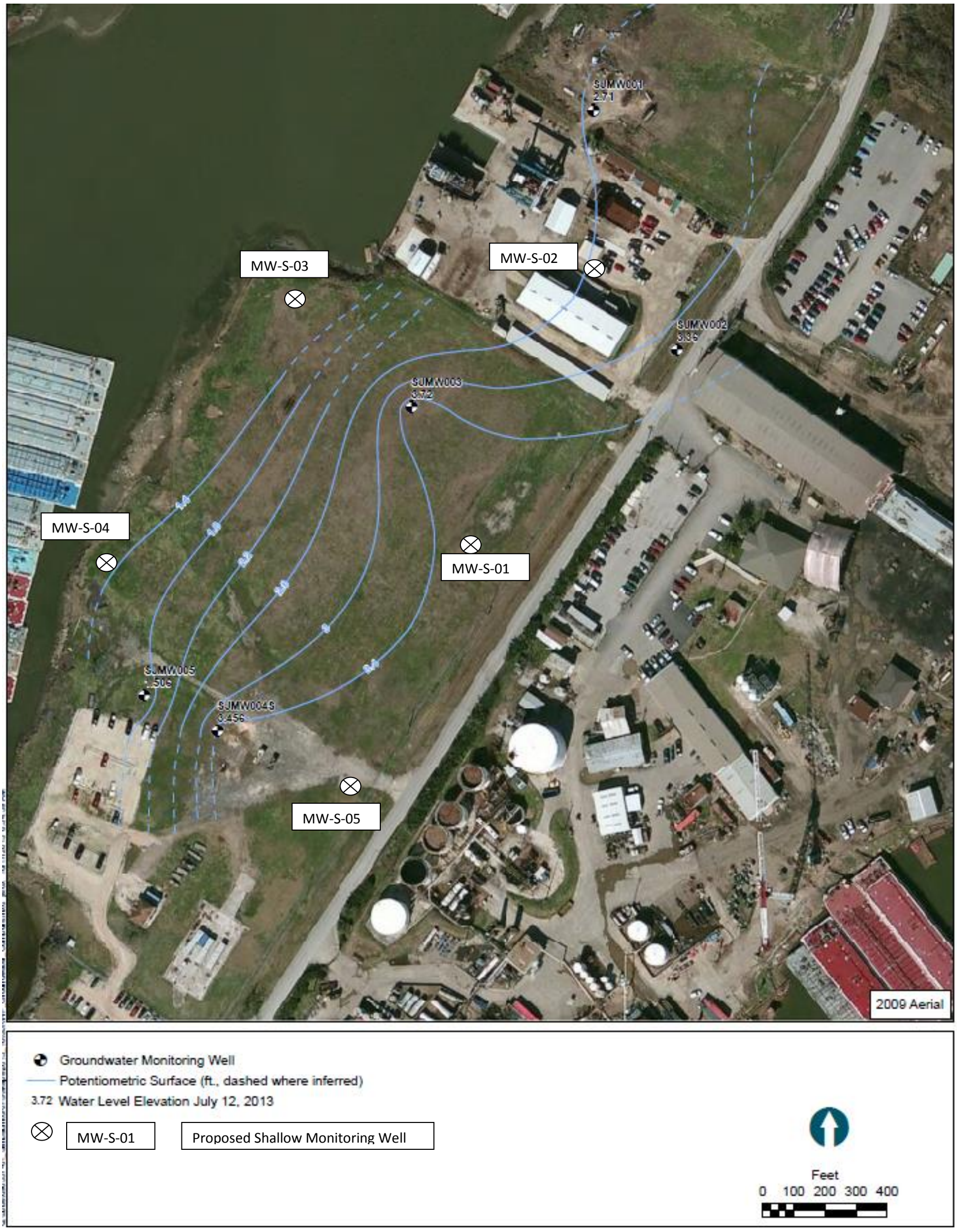


Figure 2 – Proposed Monitoring Well Locations – Southern Impoundments Area (base map: Anchor QEA, November 2013, Figure 2-1)


Passive Porewater Samplers in Cap
Passive Porewater Samplers in Ditch
Passive Porewater Samplers in Sediment
Porewater Reference Site
Water Sampling
Approximate Extent of Former Impoundments
N
0 50 100 200 300 400
Feet
Note: Sample positions may vary from illustration based on field considerations (depth, substrate, accessibility).


Passive Porewater Samplers
Surface Water Sample
Approximate Extent of Former Impoundments
N
0 50 100 200 300 400
Feet
Note: Sample positions may vary from illustration based on field considerations (depth, substrate, accessibility).


Sediment & Porewater Reference Site
Surface Water Reference Site
N
0 500 1,000 2,000 3,000 4,000
Feet
Note: Sample positions may vary from illustration based on field considerations (depth, substrate, accessibility).